

# ***The Lost Ship***

- You are a member of the US Coast Guard on duty at coastal headquarters when you begin getting distress calls from a cargo ship that has been hijacked by modern day pirates. They're taking the ship as fast as it can go in a straight line out to international waters to escape. All you have is the following data showing the ship's location at certain times. You need to radio the nearest USCG gun ship immediately and tell them the cargo ship's **current** coordinates and velocity.



# ***The Lost Ship***

Time	X position	Y position
1:00	201km E	50km N
1:30	230km E	51km N
2:00	261km E	50km N
2:30	291km E	49km N
3:00	320km E	50km N

The CG HQ is the origin of these coordinates. The current time is 3:58. Hurry! Time is of the essence!

- Write out all calculations and graphs made to help you find the ship and explain any estimations or rounding that was done. Write out what was said between you and the captain of the USCG ship when you radioed him the necessary information.



## **Lesson #4**

### **Topic: Distance and Displacement**

**Objectives:** (After this class I will be able to) \_\_\_\_\_

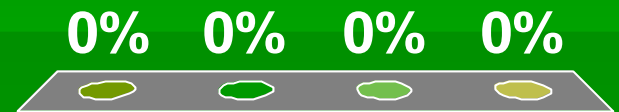
1. Describe the difference between distance and displacement, and speed and velocity

**Project:** Walk a distance of 4 meters without having any displacement. Have your partner measure for you.

Assignment: New Wikispace post. Read and respond.

***Find the distance and displacement traveled for a person who walks 6 m North, 6 m East, 6 m South, and 6 m West.***

1. Distance = 0m  
Displacement=0m
2. Distance = 0m  
Displacement=24m
3. Distance = 24m  
Displacement=0m
4. Distance = 24m  
Displacement= 24m



Distance = 0m Disp...

Distance = 0m Disp...

Distance = 24m Disp...

Distance = 24m Disp...

**Distance:** Add up the entire length traveled.

---

**Displacement:** Measure the distance and direction between the starting point and ending point.

**Speed:** Distance divided by time

---

**Velocity:** Displacement divided by time

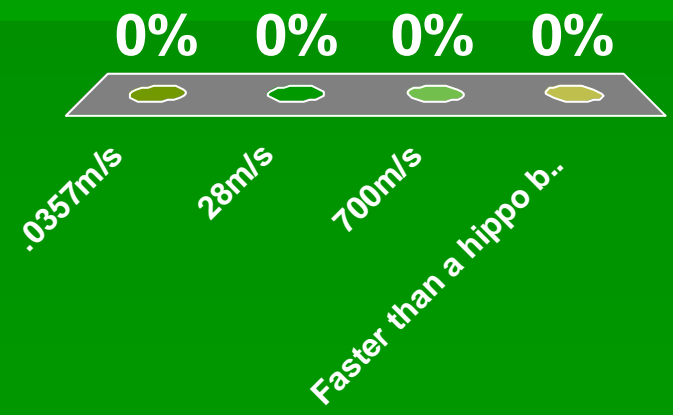
# ***Practice Problems***

A man walks 20 m east, then 5 m south, then 10 m west, then 3 m south, then 5 m west, then 4 m north, and 5m west.

- What is the total distance the man walked?
- What is the man's displacement?

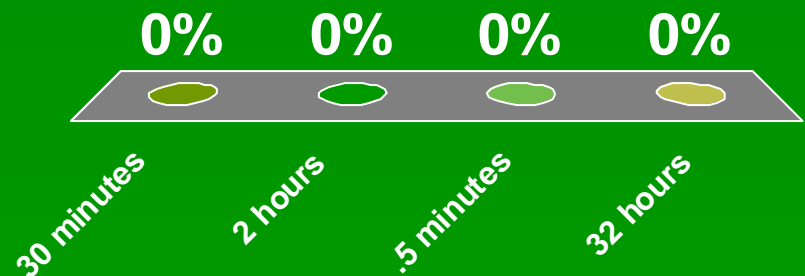
***Calculate the average speed of a cheetah that runs 140 m in 5 seconds.***

1. .0357m/s
2. 28m/s
3. 700m/s
4. Faster than a hippo but slower than a rhino



***Calculate how long it takes Charlie to run to the store 4km away if he runs with an average velocity of 8km/hr.***

1. 30 minutes
2. 2 hours
3. .5 minutes
4. 32 hours



## **Lesson #6**

### **Topic: Lab #1 Graphing Motion**

**Objectives:** (After this class I will be able to)

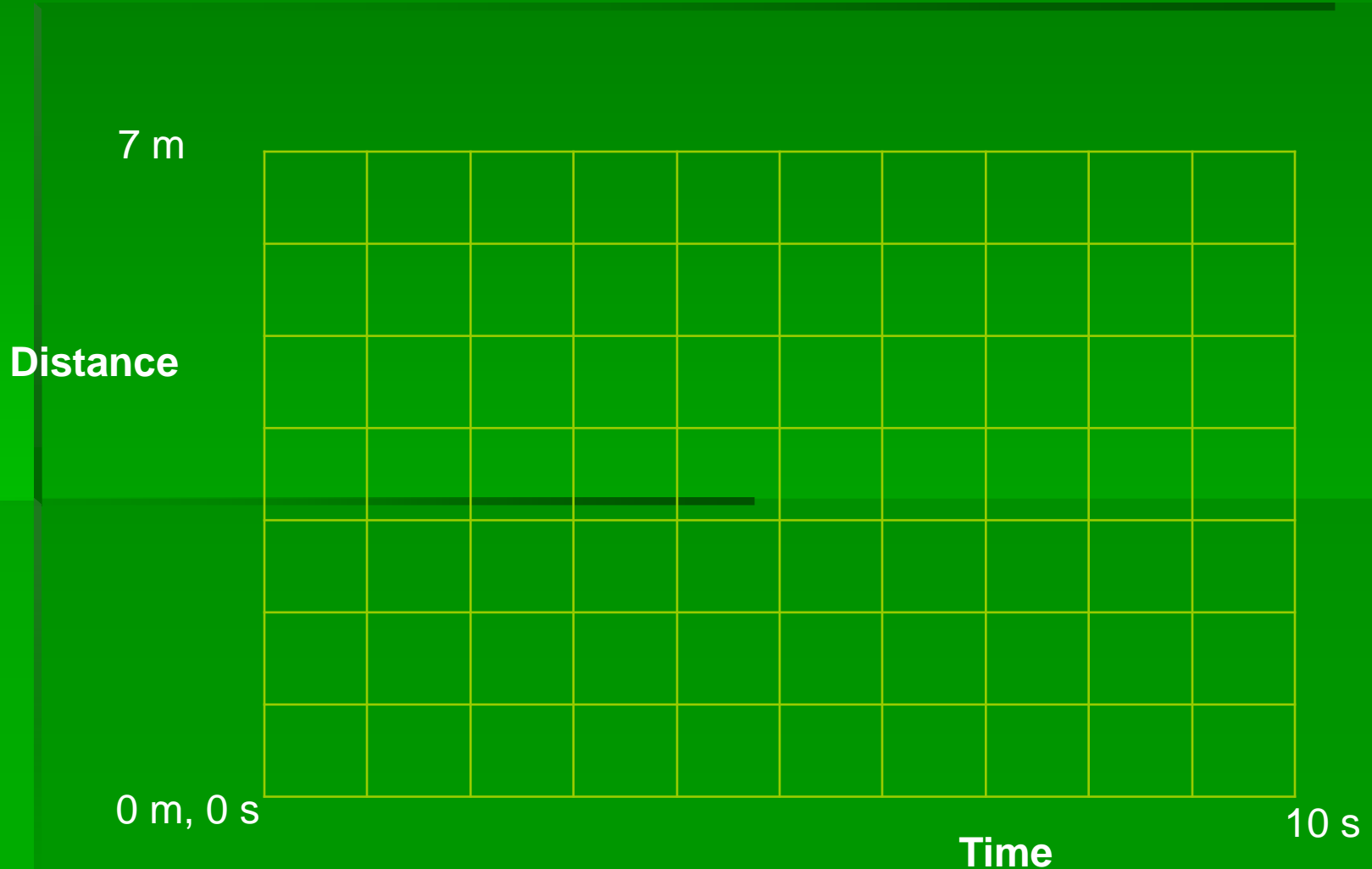
1. Describe the motion of an object given a distance vs. time graph

**Task:** Collect data with a motion detector to trace a graph on the computer screen.

**Assignment:** 9/5/07 Study guide and quiz 2.3

9/6/07 Ch 2 Supplemental Problems

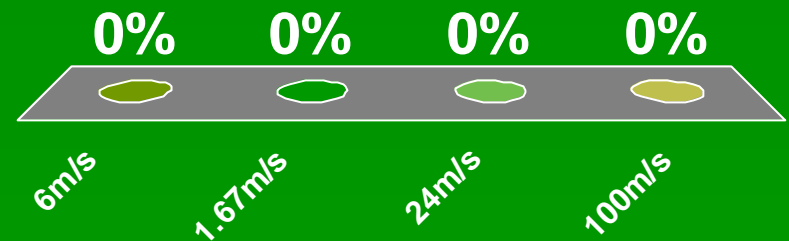
# ***What is the object doing?***



***What is the average velocity of a person who jogs 12 km in 2 hours? State your answer in meters / second?***

1. 6m/s
2. 1.67m/s
3. 24m/s
4. 100m/s

0  
of  
20



## **Lesson #5**

### **Topic: Velocity and Graphing Motion**

**Objectives:** (After this class I will be able to)

1. Create a distance vs. time graph of the motion of an object

**Project:** Create a graph of the motion of the following object.

Insert video of car moving or show car moving on track

Assignment: "Velocity and Graphing"

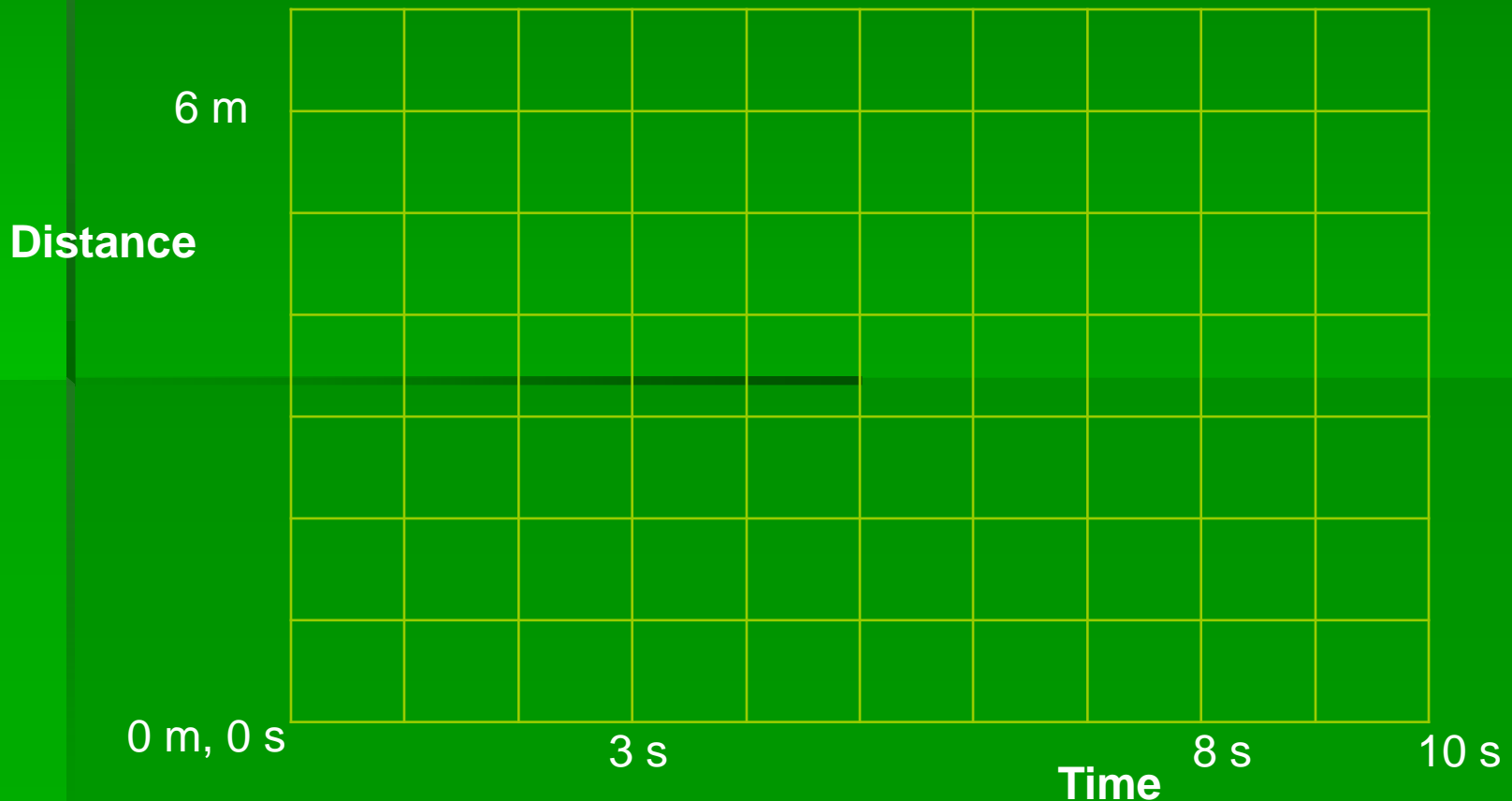
Cool T-Shirt Quiz

# ***Graphing Motion***

A woman walks out of her house towards her car. The car is 6 m away and it takes her 3 seconds to get there.

She sits in her car for 5 seconds until she realizes she forgot her keys.

She jogs back to the house in 2 seconds.

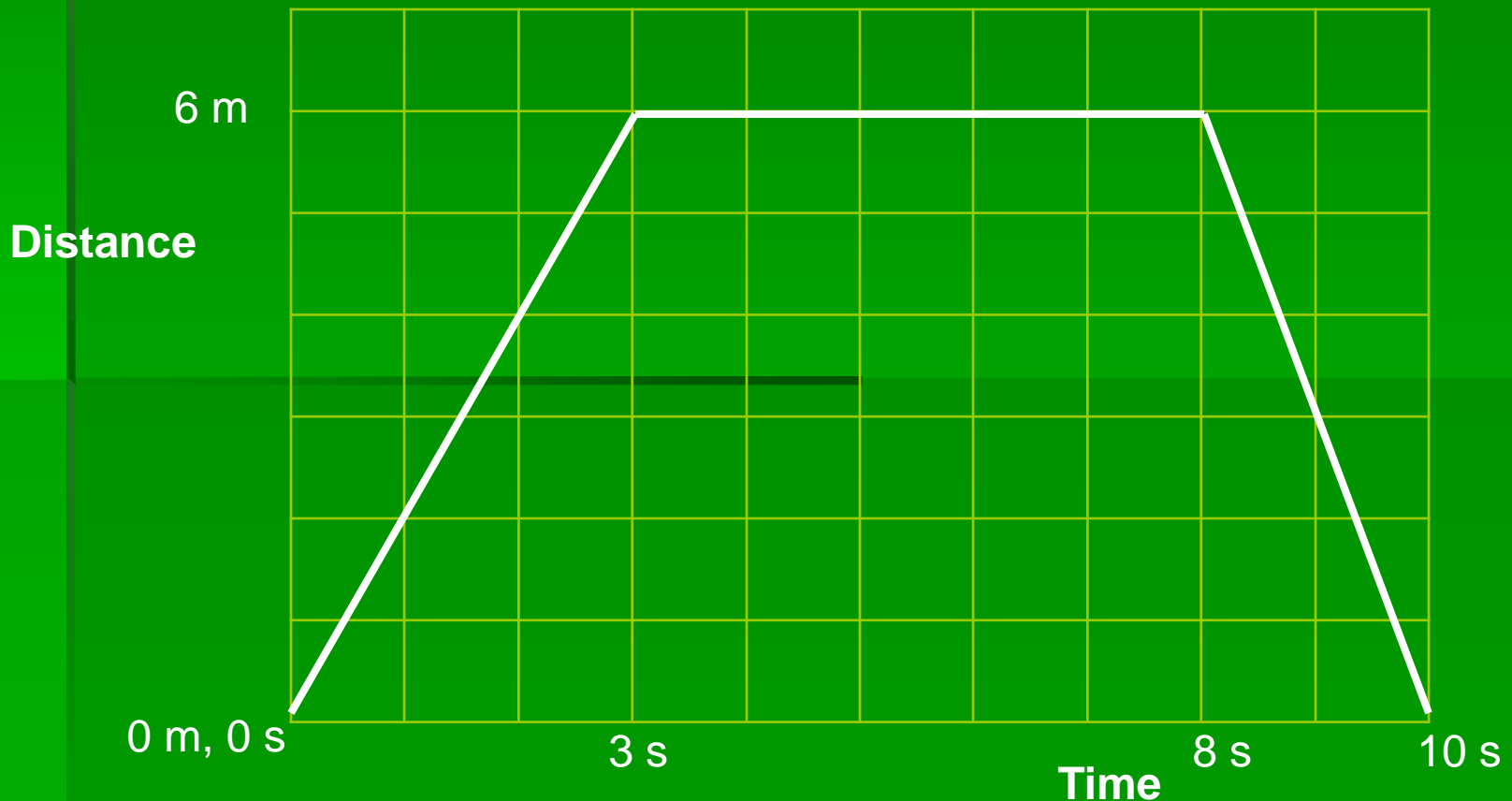


# ***Graphing Motion***

The **velocity** of the woman at each section of time is the **slope** of the **Distance vs. Time** graph.

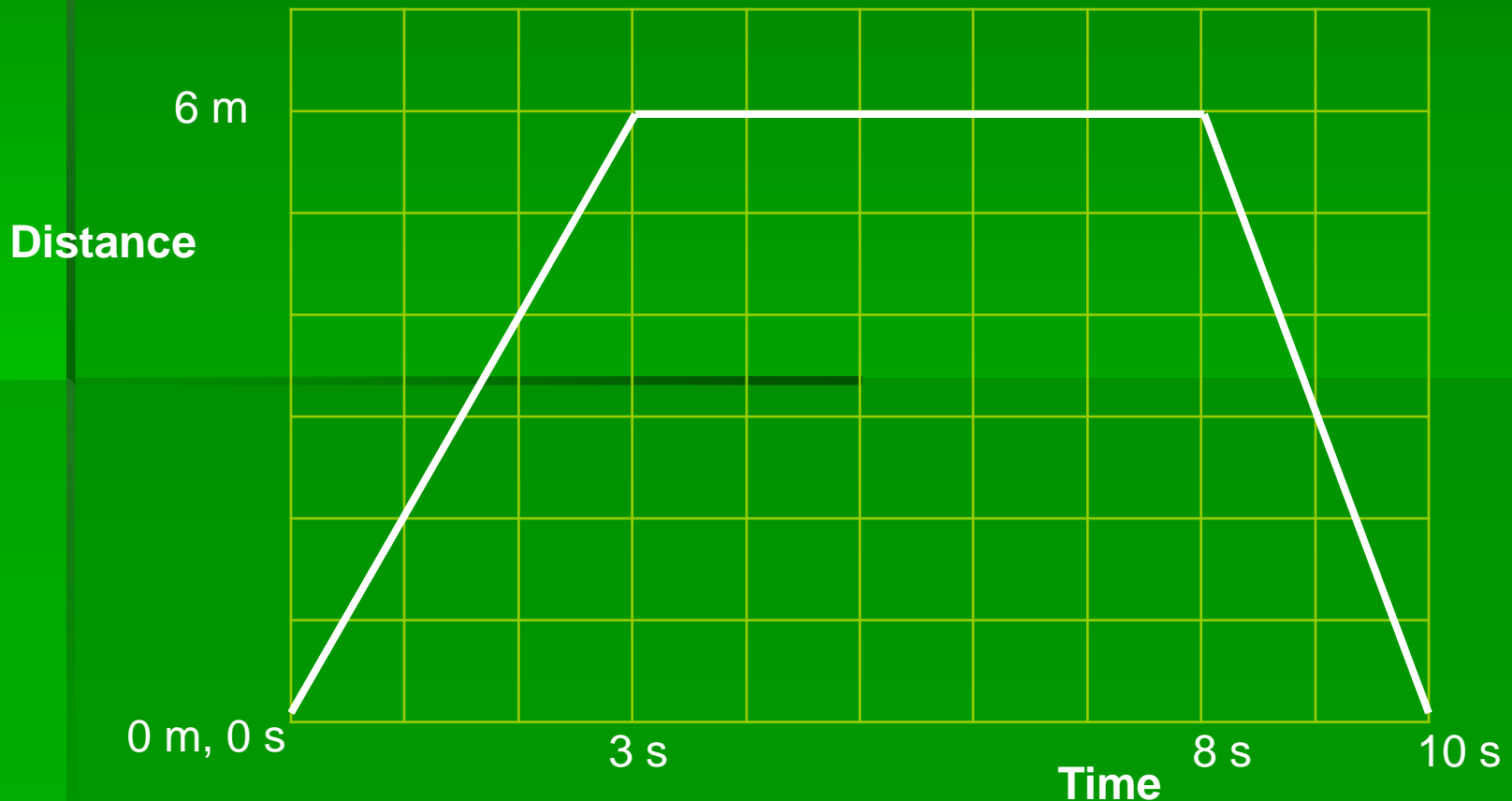
**Slope = change in rise / change in run**

**Example:** change in distance / change in time



# ***Graphing Motion***

Find the velocity for the first, second, and third sections of time in this graph.



# ***English Project***

- You are writing a short adventure story for your English class. In your story, two submarines on a secret mission need to arrive at a place in the middle of the Atlantic ocean at the same time. They start out at the same time from positions equally distant from the rendezvous point. They travel at different velocities but both go in a straight line. The first submarine travels at an average velocity of 20 km/hr for the first 500 km, 40 km/hr for the next 500 km, 30 km/hr for the next 500 km and 50 km/hr for the final 500 km. In the plot, the second submarine is required to travel at a constant velocity, so the captain needs to determine the magnitude of that velocity.

# ***English Project***

- Graph the motion of the first sub on a distance vs. time graph.
- Then graph the motion of the second sub on the same graph to help the Henson visualize the motion of both subs.
- Write the conversation between the captain and Henson of the second sub explaining how he calculated the correct speed.

